

CLAIMS

1. An integrated circuit having a plurality of I/O modules comprising:
- 5 a bond pad formed on a substrate;
- an electrostatic discharge device formed in the substrate, the electrostatic discharge device being at least partially formed beneath the bond pad;
- 10 an I/O buffer formed in the substrate and connected to the bond pad, the I/O buffer providing communication between the bond pad and circuitry formed in the substrate, wherein the circuitry is positioned substantially adjacent to both the electrostatic discharge device and the I/O buffer.
- 15 2. The integrated circuit of Claim 1 wherein the substrate is a silicon substrate.
3. The integrated circuit of Claim 1 wherein the I/O buffer is an output buffer.
4. The integrated circuit of Claim 1 wherein the I/O buffer is an input buffer.
- 20 5. The integrated circuit of Claim 1 wherein the I/O buffer is a complementary output buffer.
6. The integrated circuit of Claim 1 wherein the circuitry is CMOS circuitry.

7. The integrated circuit of Claim 1 wherein the circuitry is BiCMOS circuitry.
8. The integrated circuit of Claim 1 wherein the circuitry is an application specific integrated circuit.
9. The integrated circuit of Claim 1 wherein the circuitry is a digital signal processor.
10. The integrated circuit of Claim 1 wherein the entire surface of the substrate beneath the bond pad is occupied by the electrostatic discharge device.
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11. An integrated circuit comprising:
- a functional core formed on a substrate, the functional core being positioned centrally on the substrate; and
 - an I/O region positioned at the periphery of the functional core, the I/O region including a plurality of I/O modules, the I/O modules including:
 - a bond pad formed on a substrate;
 - an electrostatic discharge device; and
 - an I/O buffer wherein the I/O buffer is not positioned between the bond pad and the functional core.
12. The integrated circuit of Claim 11 wherein the substrate is a silicon substrate.

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13. The integrated circuit of Claim 11 wherein the I/O buffer is an output buffer.
14. The integrated circuit of Claim 11 wherein the I/O buffer is an input buffer.
- 5 15. The integrated circuit of Claim 11 wherein the I/O buffer is a complementary output buffer.
16. The integrated circuit of Claim 11 wherein the functional core is CMOS circuitry.
- 10 17. The integrated circuit of Claim 11 wherein the functional core is BiCMOS circuitry.
18. The integrated circuit of Claim 11 wherein the functional core is an application specific integrated circuit.
- 15 19. The integrated circuit of Claim 11 wherein the functional core is digital signal processor.
20. The integrated circuit of Claim 11 wherein the entire surface of the substrate beneath the bond pad is occupied by the electrostatic discharge device.
21. An integrated circuit comprising:
- 20 a functional core formed on a substrate, the functional core including a plurality of integrated circuit elements and being positioned centrally on the substrate; and
- an I/O region positioned at the periphery of

a bond pad formed on a substrate, the bond pad including a conductive surface for providing electrical connection to external devices;

a CMOS I/O buffer wherein the I/O buffer is not positioned between the bond pad and the functional core.

forming a bond pad formed on a substrate;

forming an electrostatic discharge device
formed in the substrate, the electrostatic discharge
device being at least partially formed beneath the
bond pad; and

forming an I/O buffer formed in the substrate and connected to the bond pad, the I/O buffer providing communication between the bond pad and circuitry formed in the substrate, wherein the circuitry is positioned substantially adjacent to both the electrostatic discharge device and the I/O buffer.

23. The method of Claim 22 wherein the substrate is a silicon substrate.
24. The method of Claim 22 wherein the I/O buffer is an output buffer.
- 5 25. The method of Claim 22 wherein the I/O buffer is an input buffer.
26. The method of Claim 22 wherein the I/O buffer is a complementary output buffer.
27. The method of Claim 22 wherein the circuitry is CMOS
10 circuitry.
28. The method of Claim 22 wherein the circuitry is BiCMOS circuitry.
29. The method of Claim 22 wherein the circuitry is an application specific integrated circuit.
- 15 30. The method of Claim 22 wherein the circuitry is digital signal processor.
31. The method of Claim 22 wherein the entire surface of the substrate beneath the bond pad is occupied by the electrostatic discharge device.
- 20 32. A method for forming an integrated circuit comprising:
providing a functional core formed on a substrate, the functional core being positioned centrally on the substrate; and

in an I/O region positioned at the periphery of the functional core, forming a plurality of I/O modules, the steps for forming the I/O modules including:

- 5 forming a bond pad formed on a substrate;
 forming an electrostatic discharge device;
and

 forming an I/O buffer wherein the I/O
buffer is not positioned between the bond pad and
10 the functional core.

33. The method of Claim 32 wherein the substrate is a
silicon substrate.
34. The method of Claim 32 wherein the I/O buffer is an
output buffer.
- 15 35. The method of Claim 32 wherein the I/O buffer is an
input buffer.
36. The method of Claim 32 wherein the I/O buffer is a
complementary output buffer.
37. The method of Claim 32 wherein the functional core
20 is CMOS circuitry.
38. The method of Claim 32 wherein the functional core
is BiCMOS circuitry.
39. The method of Claim 32 wherein the functional core
is an application specific integrated circuit.

40. The method of Claim 32 wherein the functional core is digital signal processor.
41. The method of Claim 32 wherein the entire surface of the substrate beneath the bond pad is occupied by the electrostatic discharge device.

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